920476-904966

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of	:	Julian Mitchell et al.
Serial No.	:	10/037,043
Filed	:	November 9, 2001
For	:	Middlebox Control
Examiner	:	Bengzon, Greg C
Art Unit	:	2144
Customer number	:	23644
Confirmation No.	:	5564

APPEAL BRIEF

Honorable Director of Patents and Trademarks
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This appeal is from the Examiner's final Office Action mailed September, 4 2007 in which all pending claims (namely Claims 1-13, 15-20, 23-25, 27 and 29-31) were rejected. A timely Notice of Appeal was filed with the required fee on November 5, 2007.

This brief is being filed along with the required $510 fee pursuant to 37 C. F. R. § 41.20(b)(2). The necessary Petition for Extension of Time and its fee of $460 is also being submitted herewith.

(i) Real Party in Interest

This application is assigned to Nortel Networks Limited. The assignments are recorded at Reel 012437, Frame 0452 et al.

(ii) Related Appeals and Interferences

There are no related appeals or interferences.

(iii) Status of Claims

This application was filed with claims 1 to 28. Claims 14, 21, 22, 26 and 28 have been cancelled. In the responses of June 20, 2005, October 10, 2005, June 8, 2006, December 8, 2006 and July 16, 2007 claims 1, 6, 11, 18, 24, 25 and 27 were each amended at least once. Claims 29 to 31 were added in the response of June 8, 2006. The remaining claims are as originally filed. All currently pending claims are rejected. Claims 1-13, 15-20, 23-25, 27 and 29-31 are the claims appealed.

(iv) Status of Amendments

No amendment or response was filed subsequent to the September 4, 2007 final Office Action.

(v) Summary of Claimed Subject Matter

The invention as presently claimed is concerned with use of a middlebox-identity-providing node separate from the middlebox control node. The middlebox-identity-providing node determines the identity of the middlebox to which an entity is connected and transmits this identity to a middlebox control node.

In this way the middlebox control node is enabled so that it can send control messages to the correct middlebox for an entity. All the middleboxes falling within the presently claimed invention are connected to entities in different address realms and may be used, for example to convert the addresses of one address realm to that of another address realm.

It is well known that an entity, to request a connection to be set up with another entity, transmits a control message to the other entity. In the instance where middleboxes are used the control message is transmitted via a call server as shown in Figure 1. Usually, the call server contains all the information about middleboxes they require and uses this information to control the middlebox so that it performs the required tasks.

In the present invention the need for the middlebox control node to maintain the information about the middleboxes is negated. Instead a middlebox-identity-providing node that is separate from the control node is provided (page 9 lines 14 to 17). This means that the node responsible for obtaining information about the middleboxes can be located nearer to the endpoints that they provide information about. This means that changes to the network do not require changes in the control node but rather the middlebox-identity-providing node can be reconfigured. In this way the flexibility of the network is greatly increased.

The information from the middlebox-identity-providing node can be sent to the middlebox control node by, for example, adding the middlebox identity to a control message which may be an SDP message.

(vi) Grounds of Rejection To Be Reviewed on Appeal

There are 5 rejections at issue:

1. the rejection of claims 1 to 3, 6 to 12, 15, 16, 18, 19, 23 to 25 and 27 under 35 USC § 103(a) as being unpatentable over Xu (US Publication 2002/0114322) in view of Huitema (IETF Working Document "MIDCOM Scenarios"), further in view of Solle (US Publication 2003/0009561);

2. the rejection of claims 4, 5, 20 and 29 under 35 USC § 103(a) as being unpatentable over Xu (US Publication 2002/0114322) in view of Huitema (IETF Working Document "MIDCOM Scenarios"), further in view of Solle (US Publication 2003/0009561) and further in view of Handley (IETF Working Document RFC2327 "SDP: Session Description Protocol");

3. the rejection of claim 13 under 35 USC § 103(a) as being unpatentable over Xu (US Publication 2002/0114322) in view of Huitema (IETF Working Document "MIDCOM Scenarios"), further in view of Solle (US Publication 2003/0009561) and further in view of Srisuresh (IETF Working Document "Middlebox Communication Architecture and Framework");

4. the rejection of claim 17 under 35 USC § 103(a) as being unpatentable over Xu (US Publication 2002/0114322) in view of Huitema (IETF Working Document "MIDCOM

Scenarios"), further in view of Solle (US Publication 2003/0009561) and further in view of Elgebaly (US Publication 2002/0152325); and

5. the rejection of claims 30 and 31 under 35 USC § 103(a) as being unpatentable over Xu (US Publication 2002/0114322) in view of Huitema (IETF Working Document "MIDCOM Scenarios"), further in view of Solle (US Publication 2003/0009561) and further in view of Collins (US Publication 2003/0055978).

(vii) Argument

Ground 1.

The Examiner has rejected Claims 1 to 3, 6 to 12, 15, 16, 18, 19, 23 to 25 and 27 as being unpatentable over Xu (US Publication 2002/0114322) in view of Huitema (IETF Working Document "MIDCOM Scenarios"), further in view of Solle (US Publication 2003/0009561). Applicants respectfully disagree.

Xu describes a conventional use of a middlebox. In Xu "each client remains registered with a proxy server" (emphasis). When a media session is initiated by a first client the first client "may provide the proxy server with which the first client is registered for example, with identity of the second client to which it would like initiate a media session". "The proxy server then interrogates the directory server to determine with which proxy server the second client 30(d) is registered... the two proxy servers then facilitate the exchange of messages for setting up the media session for communicating other messages representing media session negotiation between each of the first client and the second client". (paragraph 49).

This is an analogous situation to that discussed in the background of the present application where middleboxes use a call server to obtain information of the middlebox associated with a client.

Applicants submit that from this description and Figure 1 one skilled in the art would only learn to store a database on a proxy server or directory server of the IP address or proxy server respectively associated with a client using a middlebox.

Thus, it is submitted that Xu does not disclose, at least, the features of: "using the middlebox identity providing node to determine the identity of a first middlebox connected to said one entity in its respective one of the plurality of address realms" or "sending said identity to a middlebox control node in the communications network in order to enable

said middlebox control node to send middlebox control messages to said first middlebox" wherein "the middlebox-identity-providing node is separate from the middlebox control node".

The Examiner cites Huitema as disclosing that NATs are a type of middlebox. Applicants do not disagree with this interpretation. Indeed, it is noted that NATs are described as an example of a middlebox on page 1 line 13 of the instant application.

Applicants submit however, that Huitema only discloses the features of a known middlebox. Thus, one skilled in the art, upon reading Huitema, would only learn to apply the disclosure of Xu using a standard middlebox. For example, page 8 of Huitema describes a call set up protocol where, in step 4, "the external server determines that the target of the invite is located in a specific external host. It relays the call to this host". Nowhere does Huitema disclose or even suggest how the external host is discovered.

Thus, it is submitted that Huitema in combination with Xu does not disclose or even suggest "using the middlebox identity providing node to determine the identity of a first middlebox connected to said one entity in its respective one of the plurality of address realms" or "sending said identity to a middlebox control node in the communications network in order to enable said middlebox control node to send middlebox control messages to said first middlebox" wherein "the middlebox-identity-providing node is separate from the middlebox control node".

The Examiner contends that Sollee discloses that a media portal, disposed between an NAPT module and an application server, acquires the public address of the corresponding NATs and propagates them to the application server.

Applicants respectfully disagree. In Sollee a call set up process between is described. At the beginning of the call set up the NAPT "substitutes $A_{private}$ (the source address and port...) with A_{public} and forwards the modified packet containing the SIP INVITE message to the first application server. Upon receiving the SIP INVITE message, the first application server locates the application server for the yyy.com domain (of enterprise device B) and engages the first media portal to prepare NAPT mappings for the call session" (paragraph 90 to 91).

The second application server upon receiving the SIP INVITE message from the first application server "locates B@yyy.com [the identity of enterprise device B] and engages the second media portal to reserve NAPT resources" (paragraph 111). "The second application server uses the X+NAPTAddressType parameter in the Create Connection message to inform the second media portal 45 to allocate respective NAPT (external and internal) addresses and ports to each endpoint"(paragraph 112).

Thus it can be seen that application server 1 provides the first media portal with the NAPT identity for the first enterprise device and the second application server provides the second media portal with the NAPT identity for the second enterprise device.

Applicants therefore submit that one skilled in the art, upon reading Sollee, would not learn to use a media portal to carry out the steps of "determining the identity of a first middlebox connected to said one entity in its respective one of the plurality of address realms".

Applicants therefore submit that as none of the prior art documents cited by the Examiner disclose or even suggest an identity providing node used "to determine the identity of a first middle box connected to said one entity in its respective one of the plurality of address realms" or "sending said identity to a middlebox control node in the communications network in order to enable said middlebox control node to send middlebox control messages to said first middlebox." Claim 1, therefore, would not have been rendered obvious by Xu, in view of Huitema, further in view of Sollee (US Publication 2003/0009561).

Claim 18 recites the features of a "a middlebox-identity-providing node arranged to receive a control message comprising information about one of the entities and to determine the identity of a first middlebox connected to said one entity in its respective one of the plurality of address realms" and "a middlebox control node arranged to receive the determined identity of the first middlebox in order to enable said middlebox control node to send middlebox control messages to said first middlebox". Applicants therefore submit that Claim 18 would not have been rendered obvious in view of Xu, in view of Huitema, further in view of Sollee (US Publication 2003/0009561) for at least the reasons provided with reference to Claim 1.

Claim 23 recites the features of "an input arranged to receive an input arranged to receive a control message comprising information about the identity of one of the middleboxes" and that "in use the middlebox control node is able to control the identified middlebox without the need to maintain its own store of information about the identities of the middleboxes and without the need to maintain its own discovery mechanism to discover the identities of the middleboxes". As discussed with reference to Claim 1 Xu, Huitema and Sollee all disclose the middlebox control node maintaining the information regarding middleboxes. Therefore the skilled person, upon reading the cited prior art would not learn to have a middlebox control node that is able to control the identified middlebox without the need to maintain its own store of information about the identities of the middleboxes.

Therefore, Applicants submit that Claim 23 would not have been rendered obvious in view of Xu, in view of Huitema, further in view of Sollee.

Claim 24 recites a middlebox-identity-providing node comprising "an input arranged to receive a control message comprising information about one of a plurality of entities in the communications network", "a processor arranged to determine the identity of a first middlebox connected to said one entity in a respective one of a plurality of address realms" and "an output arranged to send said identity to a middlebox control node in the communications network, said middlebox control node being located in a different address realm than that of said one of the entities; and wherein said middlebox-identity-providing node is arranged to be located in a control signal path from said one of the entities to the middlebox control node". Applicants therefore submit that Claim 24 would not have been rendered obvious in view of Xu, in view of Huitema, further in view of Sollee (US Publication 2003/0009561) for at least the reasons provided with reference to Claim 1.

Claims 25 and 27 recite corresponding features to Claims 23 and 24. Applicants therefore submit that Claims 25 and 27 would not have been rendered obvious for at least the same reasons as Claims 23 and 24.

Applicants submit that Claims 2, 3, 6 to 12, 15, 16 and 19 would not have been rendered obvious in view of Xu, in view of Huitema, further in view of Sollee (US Publication 2003/0009561) by virtue of their dependencies.

Ground 2.

Applicants submit that Handley does not disclose a middlebox identity providing node as recited in the independent claims. Hence, Applicants submit that Claims 4, 5, 20 and 29 are patentable over Xu, in view of Huitema, further in view of Solle and further in view of Handley.

Ground 3.

Applicants submit that Srisuresh does not disclose a middlebox identity providing node as recited in the independent claims. Hence, Applicants submit that Claim 13 is patentable over Xu, in view of Huitema, further in view of Solle and further in view of Srisuresh.

Ground 4.

Applicants submit that Elgebaly does not disclose a middlebox identity providing node as recited in the independent claims. Hence, Applicants submit that Claim 17 is patentable over Xu, in view of Huitema, further in view of Solle and further in view of Elgebaly.

Ground 5.

Applicants submit that Collins does not disclose a middlebox identity providing node as recited in the independent claims. Hence, Applicants submit that Claim 13 is patentable over Xu, in view of Huitema, further in view of Solle and further in view of Collins.

It has therefore been demonstrated above that the Examiner's rejections of the application are in error, and should be reversed. Such action is therefore solicited.

March 5, 2008

Respectfully submitted,

William M. Lee, Jr.
Registration No. 26,935
Barnes & Thornburg LLP
P.O. Box 2786
Chicago, Illinois 60690-2786
(312) 214-4800
(312) 759-5646 (fax)

Claims Appendix

1. A method of controlling one of a plurality of middleboxes in a communications network, each of the middleboxes being connected to a plurality of entities in a respective one of a plurality of address realms of the communications network, said method comprising the steps of:-

(i) receiving a control message at a middlebox-identity-providing node in the communications network, said control message comprising information about one of the entities in the communications network;

(ii) using the middlebox identity providing node to determine the identity of a first middlebox connected to said one entity in its respective one of the plurality of address realms;

(iii) sending said identity to a middlebox control node in the communications network in order to enable said middlebox control node to send middlebox control messages to said first middlebox, said middlebox control node being located in a different address realm than that of said one of the entities;

and wherein the middlebox-identity-providing node is separate from the middlebox control node and is located in a control signal path from said one of the entities to the middlebox control node.

2. A method as claimed in claim 1 wherein said step (iii) of sending said identity comprises adding said identity to a control message and sending said control message.

3. A method as claimed in claim 2 wherein additional information is also added to the control message.

4. A method as claimed in claim 2 wherein said control message is a session description protocol (SDP) message.

5. A method as claimed in claim 4 wherein said identity is added to an SDP message using a pre-specified SDP attribute.

6. A method as claimed in claim 1 wherein said control message is a call set-up message and said method further comprises sending middlebox control messages to said first middlebox in order to set-up a call from said one entity to another entity connected to a second middlebox in the communications network.

7. A method as claimed in claim 6 wherein said second middlebox is connected to a plurality of entities in a second address realm different from the first address realm of the entities connected to the first middlebox.

8. A method as claimed in claim 7 wherein the middlebox control node is within a third address realm different from the first and second address realms.

9. A method as claimed in claim 8 wherein the third address realm is public.

10. A method as claimed in claim 9 wherein the first and second address realms are private.

11. A method as claimed in claim 1 wherein the middlebox-identity-providing node is selected from: one of the middleboxes; a gateway in the communications network; said one entity, being a user terminal in the communications network; and a gateway comprising a business services channel manager (BSCM).

12. A method as claimed in claim 6 wherein said call passes through two or more middleboxes and wherein information about the identity of each such middlebox is added to said control message.

13. A method as claimed in claim 1 wherein said middlebox control node is a MIDCOM agent.

14. (cancelled)

15. A method as claimed in claim 1 wherein each of the middleboxes is selected from a firewall, a network address translator (NAT), and a quality of service device.

16. A method as claimed in claim 1 wherein said middlebox-identity-providing node is arranged to determine the identity of the first middlebox by using pre-specified information.

17. A method as claimed in claim 1 wherein said middlebox-identity-providing node is arranged to determine the identity of the first middlebox by automatically analysing the communications network.

18. A communications network comprising:

(i) a plurality of middleboxes, each connected to a plurality of entities in a respective one of a plurality of address realms of the communications network;

(ii) a middlebox-identity-providing node arranged to receive a control message comprising information about one of the entities and to determine the identity of a first middlebox connected to said one entity in its respective one of the plurality of address realms;

(iii) a middlebox control node arranged to receive the determined identity of the first middlebox in order to enable said middlebox control node to send middlebox control messages to said first middlebox; said middlebox control node being located in a different address realm than that of said one of the entities, said middlebox-identity-providing node being separate from the middlebox control node and being located in a control signal path from said one of the entities to the middlebox control node.

19. A communications network as claimed in claim 18 wherein said middlebox-identity-providing node is further arranged to send said determined identity to the middlebox control node as part of a control message.

20. A communications network as claimed in claim 19 wherein said control message is a session description protocol message.

21 & 22. (cancelled)

23. A middlebox control node arranged to control a plurality of middleboxes in a communications network, said middlebox control node comprising:

(i) an input arranged to receive a control message comprising information about the identity of one of the middleboxes;

(ii) a processor arranged to issue messages to the identified middlebox in order to control it; such that in use the middlebox control node is able to control the identified middlebox without the need to maintain its own store of information about the identities of the middleboxes and without the need to maintain its own discovery mechanism to discover the identities of the middleboxes.

24. A middlebox-identity-providing node for use in a communications network comprising a plurality of middleboxes, said middlebox identity providing node comprising:

(i) an input arranged to receive a control message comprising information about one of a plurality of entities in the communications network;

(ii) a processor arranged to determine the identity of a first middlebox connected to said one entity in a respective one of a plurality of address realms;

(iii) an output arranged to send said identity to a middlebox control node in the communications network, said middlebox control node being located in a different address realm than that of said one of the entities; and wherein said middlebox-identity-providing node is arranged to be located in a control signal path from said one of the entities to the middlebox control node.

25. A computer readable medium comprising program instructions arranged to control a middlebox control node, said middlebox control node comprising an input arranged to receive a control message comprising information about the identity of one of the middleboxes; and a processor arranged to issue messages to the identified middlebox in order to control it; such that in use the middlebox control node is able to control the identified middlebox without the need to maintain its own store of information about the identities of the middleboxes and without the need to maintain its own discovery mechanism to discover the identities of the middleboxes;

the computer program comprising program code executable by the processor in order to enable the middlebox control node to:

- receive a control message comprising information about the identity of one of the middleboxes; and to

- issue messages to the identified middlebox in order to control it.

26. (cancelled)

27. A computer readable medium comprising program instructions arranged to control a middlebox-identity-providing node, said middlebox identity providing node comprising an input arranged to receive a control message comprising information about one of a plurality of entities in the communications network; a processor arranged to determine the identity of a first middlebox connected to said one entity in a respective one of a plurality of address realms; and an output arranged to send said identity to a middlebox control node in the communications network, said middlebox control node being located in a different address realm than that of said one of the entities; and wherein said middlebox-identity-providing node is arranged to be located in a control signal path from said one of the entities to the middlebox control node;

the computer program comprising program code executable by the processor in order to enable the middlebox identity-providing node to:

- receive a control message comprising information about one of a plurality of entities in the communications network;

- determine the identity of a first middlebox connected to said one entity; and

- send said middlebox identity to a middlebox control node in the communications network.

28. (cancelled)

29. A method ad claimed in claim 1, wherein the first middlebox is arranged to act as two or more independent middleboxes and wherein the step of providing the identity of the first middlebox to the middlebox control node comprises providing the identity of the first middlebox and the identity of a particular middlebox functionality relating to one of said two or more independent middleboxes that is to be used.

30. A method as claimed in claim 1, wherein the middlebox identity providing node uses a discovery algorithm to automatically obtain information about the identity of middleboxes in the communications network.

31. A method as claimed in claim 1, wherein the middlebox identity providing node uses a discovery algorithm to automatically obtain information about the identity of middleboxes in the communications network prior to one of the receiving and determining steps.

Evidence Appendix

There is no such appendix.

Related Proceedings Appendix

There is no such appendix.